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Detection via Persistence: Leveraging Commercial Imagery from Small Satellites

Sandia National Laboratories and BlackSky Geospatial Solutions Inc. are engaged in an exploratory effort to examine how the capabilities emerging in the small satellite industry, combined with the unique nonproliferation and analytical capabilities at a U.S. national laboratory, can improve remote proliferation detection (PD) and other fields such as safeguards. The effort seeks to leverage capabilities such as adaptable, automated, high-sampling over surrogate sites with increased frequency and rapid revisit rates based on events unfolding on the ground. Such capabilities could be utilized for pattern-of-life analysis or to detect key remotely observable signatures such as the construction of facilities not included in an onsite inspection or a safeguards design information questionnaire. Companies such as BlackSky are developing the next generation of small satellite systems capable of collecting those signatures. Distinguishing factors of BlackSky include their rapid revisit rates (up to 30 imaging opportunities/day by 2020), individual satellite tasking, and publicly accessible, low cost images, delivering 1-m resolution shots at $400/image or less. The increased revisit rates will allow constellations to conduct near real-time activity monitoring of specific geolocations. BlackSky and Sandia also have unique data fusion capabilities. BlackSky can collect large numbers of images, produce correlating reports with photos, create custom alerts, and allow customers to task their satellites if an image is not archived. Sandia maintains strong nonproliferation and data analytics expertise, particularly in machine learning algorithms, change detection, remote sensing data acquisition, modeling and simulation, and neural networks. This paper explores a public-private partnership that leverages these unique capabilities to provide access to mature, deployed technology that, if successful, could provide access to a vast expansion of tools and techniques for safeguards at a fraction of the cost of current government-sponsored systems for a fixed period of time, freeing governments from long-term, costly, and oversubscribed programs.

Which ”Key Question” does your Abstract address?

TEC3.2

Topics

TEC3

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